Curbing hepatitis C virus spread in Egypt

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Hepatitis C virus (HCV) is a parenterally transmitted pathogen that has infected about 185 million people worldwide[1] and is a major cause of cirrhosis and hepatocellular carcinoma. The recent advent of direct-acting antivirals[1] has revolutionised the treatment of hepatitis C. Direct-acting antivirals achieve a permanent cure in over 90% of cases and have little or no side-effects.[1] Treatment schedules are simple and short, with little or no monitoring needed. Thus, direct-acting antivirals will soon make obsolete present regimens containing interferon alfa and ribavirin, which have frustrated patients and health-care providers alike for years with their meagre effectiveness and poor safety profiles.

In resource-rich countries, HCV prevalence is low: most new infections occur among people who inject drugs, whereas older infections were established iatrogenically—ie, via blood transfusions and invasive medical procedures. This route has been virtually eliminated by the introduction of standard safety procedures and an improved awareness of blood-borne pathogens. Unfortunately, unsafe injections continue to occur in developing areas, in which up to 75% of injections are still done with insufficiently sterilised equipment.[2] Unsafe injections have been estimated to transmit 8–16 million hepatitis B virus, 2·3–4·7 million HCV, and 80 000–160 000 HIV infections every year.[3]

In Egypt, HCV prevalence is about 15% among adults and incidence is about 150 000 new cases per year.[4] These high rates are due to the mass campaign of intravenous anti-schistosomiasis treatment in the 1960s–80s.[5] From this original pool of infected individuals, HCV spread to large swathes of the population because of various unsafe invasive procedures—a problem that still persists.

In *The Lancet Global Health*, Romulus Breban and colleagues[6] use mathematical modelling to estimate the effect of combined preventive and therapeutic interventions on the self-sustained spread of HCV in Egypt. Findings are expressed as R_0—the basic reproduction number—which corresponds to the number of new infections that an index case generates in an uninfected population. If everybody accessed health-care facilities for injections and invasive medical procedures according to the average rates derived from field data, the R_0 would be 1 or lower and HCV transmission would not be self-sustained. The R_0 of the spread of HCV without treatment was 3·54 (95% CI 1·28–6·18). The investigators conclude that a small core group of patients who receive frequent health-care interventions maintain the spread of HCV via a higher than mean rate of unsafe injections, infecting, as a result, several people who access the same facilities.

The investigators then estimate the effect of implementation of an enhanced injection control programme or increased antiviral treatment uptake, both untargeted or targeted to heavy injectors, and given early during the course of infection or later on. Targeting the core group of heavy injectors with treatment with greater than 80% efficacy given within 2·5 years of chronic infection would have impressive beneficial effects. Therefore, the investigators advocate screening of all patients with chronic disorders who undergo frequent injections for HCV; education of uninfected individuals about safe injection procedures and reduction of unnecessary injections; and treatment of those infected with highly effective regimens.

Furthermore, since an early treatment approach (within 2·5 years of chronic infection) would be more effective than a late treatment approach (within 15 years), the investigators suggest a periodic screening programme (every 5 years) among patients with chronic disorders to identify rapidly those who seroconvert and to treat them immediately. Thus, targeted interventions would be more successful in reducing HCV transmission than mass interventions; a similar method has been implemented in the past among sex workers to reduce HIV prevalence in Thailand.[7]

Treatment as prevention is not a new notion in the management of infectious diseases—it has been applied with success in communities affected by HIV.[8] Models have also been developed to curb the spread of HCV among people who inject drugs,[9] and can be applied to other settings in which the spread of HCV is particularly high, such as HIV-infected men who have sex with men[10] or prison inmates.[11] The successful application of these models depends on the integration of several approaches. Among people who inject drugs, HCV prevalence can only be reduced by combining efficacious treatments with opiate substitution and syringe exchange programmes.[9]

Unfortunately, there have been no field studies to prove the effectiveness of these approaches, and the high price of new direct-acting antivirals might curb widespread implementation of such programmes. Not surprisingly, companies have started reducing prices of HCV drugs through agreements with local governments. Costs will nonetheless affect prioritisation of interventions: the work by Breban and colleagues[6] is a perfect example of how to identify such priorities. Such a model is of huge relevance for other developing regions, and even for other infectious diseases, especially when epidemics are driven by inappropriate health-care practices.

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